

#### ABSTRACT OF THE DISCLOSURE

A thermally enhanced face-up BGA substrate consists of a metal (copper) core, layers, dielectric layers, conductive through-core and build-up vias. It is a new and simple structure with better thermal performance, resulting in lower cost and better reliability. Moreover, high degree of flexibility in choice of material and layer counts as well as layer thickness allows for a wide range of applications in packaging and high density printed circuit board.